Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

2013 USGS-NRCS Lidar: Maine (Cumberland, Kennebec and York)

1.2. Summary description of the data:

TASK NAME: NRCS Maine 0.7M NPS LIDAR

LiDAR Data Acquisition and Processing Production Task

USGS Contract No. G10PC00057

Task Order No. G13PD00954

Woolpert Order No. 073683

CONTRACTOR: Woolpert, Inc.

This data set is LiDAR point cloud data, which encompasses approximately 2279 square miles along with a 100 meter buffer in two separate areas within Southwest Maine. LiDAR data is a remotely sensed high resolution elevation data collected by an airborne platform. The LiDAR sensor uses a combination of laser range finding, GPS positioning, and inertial measurement technologies. The LiDAR systems collect data point clouds that are used to produce highly detailed Digital Elevation Models (DEMs) of the earth's terrain, man-made structures, and vegetation. The task required the LiDAR data to be collected at a nominal pulse spacing (NPS) of 0.7m. The final products include 2870 files containing classified LAS, one (1) meter pixel raster DEMs of the bare-earth surface in ERDAS IMG Format, and 8-bit intensity images. Each LAS file contains lidar point information, which has been calibrated, controlled, and classified. Additional deliverables include hydrologic breakline data, control data, tile index, lidar processing and survey reports in PDF format, FGDC metadata files for each data deliverable in .xml format, and LAS swath data. Collected swath files that were that were larger than 2GB were provided in multiple sub-swath files, each less than 2GB. Ground conditions: Water at normal levels; no unusual inundation; no snow; leaf off.

1.3. Is this a one-time data collection, or an ongoing series of measurements?

One-time data collection

1.4. Actual or planned temporal coverage of the data:
2013-11-05 to 2013-12-04

1.5. Actual or planned geographic coverage of the data:
W: -71.256683, E: -69.147422, N: 44.801319, S: 43.119904

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
las

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
NOAA Office for Coastal Management (NOAA/OCM)

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:
NOAA Office for Coastal Management (NOAA/OCM)

2.4. E-mail address:
coastal.info@noaa.gov

2.5. Phone number:
(843) 740-1202

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

3.2. Title:
Data Steward

4. Resources

Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Process Steps:

- 2013-12-05 00:00:00 - Using Leica ALS70 (LiDAR) system on board a Cessna 402 aircraft, 171 flight lines of high density data, at a nominal pulse spacing (NPS) of 0.7 meters, were collected for this task order (approximately 2279 square miles of southern Maine). AGL = 6500 feet - Aircraft Speed = 150 Knots, Field of View (Full) = 40 degrees, Pulse Rate = 272 kHz, Scan Rate = 42.3 Hz, with an average side lap of 25 %. Multiple returns were recorded for each laser pulse along with an intensity value for each return. A total of eleven (11) missions were flown between November 05, 2013 and December 04, 2013. Three (3) Global Navigation Satellite System (GNSS) Base Stations (Waterville Robert LeFleur Airport, Portland International Jetport, and MEGO CORS) were used in support of the LiDAR data acquisition. Specific information regarding latitude, longitude, and ellipsoid height to the L1 phase center is included in the lidar processing report. The geoid used to reduce satellite derived elevations to orthometric heights was GEOID12A. Data for the task order is referenced to the UTM Zone 19N, North American Datum of 1983 (2011), and NAVD88, in meters. Once the data acquisition and GPS processing phases are complete, the LiDAR data was processed immediately to verify the coverage had no voids. The GPS and IMU data was post processed using differential and Kalman filter algorithms to derive a best estimate of trajectory. The quality of the solution was verified to be consistent with the accuracy requirements of the project. The SBET was used to reduce the LiDAR slant range measurements to a raw reflective surface for each flight line. The coverage was classified to extract a bare earth digital elevation model (DEM) and separate last returns.The ALS70 calibration and system performance is verified on a periodic basis using Woolpert's calibration range. The calibration range consists of a large building and runway. The edges of the building and control points along the runway have been located using conventional survey methods. Inertial measurement unit (IMU) misalignment angles and horizontal accuracy are calculated by comparing the position of the building edges between opposing flight lines. The scanner scale factor and vertical accuracy is calculated through comparison of LiDAR data against control points

along the runway. Field calibration is performed on all flight lines to refine the IMU misalignment angles. IMU misalignment angles are calculated from the relative displacement of features within the overlap region of adjacent (and opposing) flight lines. The raw LiDAR data is reduced using the refined misalignment angles.
- 2013-05-31 00:00:00 - Ground control and QAQC control point survey was performed by Shyka, Sheppard & Garster Land Surveyors,(SSG), that supported the 2013 USGS NRCS lidar project. All surveys were performed in such a way as to achieve ground control that supports lidar data at 9.25 cm RMSE accuracy and satisfy a local network accuracy of 5 cm at a 95% confidence level. All control points were observed using GPS and consistent with the second order horizontal and third order vertical as defined by the NGS. All ground control survey field activities took place from December 3, 2013 to March 21, 2014. SSG collected 35 calibration control points as well as 158 supplemental QAQC points. The supplemental QAQC points were collect to be used in independent accuracy testing. The survey was performed using two (2) Leica GS15 Series GPS receivers in conjunction with simultaneous data collected across nineteen (19) Continuously Operating Reference Stations (CORS) GPS receivers. The survey was conducted utilizing Rapid Static observations made using 5-second sync rats and observations of typically 15 to 20 minutes. All GPS ground control observations were processed using Trimble Navigation's Trimble Business Center. All horizontal GPS control was based on UTM Zone 19N, NAD83(2011) expressed in meters. The vertical datum used for this project was based on the North American Vertical Datum of 1988 (NAVD88), GEOID12A, also expressed in meters.
- 2013-12-05 00:00:00 - The individual flight lines were inspected to ensure the systematic and residual errors have been identified and removed. Then, the flight lines were compared to adjacent flight lines for any mismatches to obtain a homogeneous coverage throughout the project area. The point cloud underwent a classification process to determine bare-earth points and non-ground points utilizing "first and only" as well as "last of many" LiDAR returns. This process determined Default (Class 1), Ground (Class 2), Noise (Class 7), Water (Class 9), Ignored Ground (Class 10), Overlap Default (Class 17) and Overlap Ground (Class 18). The bare-earth (Class 2 - Ground) LiDAR points underwent a manual QA/QC step to verify the quality of the DEM as well as a peer-based QC review. This included a review of the DEM surface to remove artifacts and ensure topographic quality. Classification of water (class 9) and ignored ground (class 10) was completed via the use of the hydrologic breaklines collected for the hydro-flattening phase. The overlap classes were determined by first identifying the overlapping areas and reclassifying the LAS data by offset from a corridor. This allows the returns located on the edge of the swath to be removed from the bare earth coverage in an effort to produce a more uniform data density. The returns determined to be overlap are then further classified to produce overlap default (class 17) and overlap ground (class 18). The surveyed ground control points are used to make vertical adjustments to the data set and to perform the accuracy checks and statistical analysis of the LiDAR dataset. Supervisory QC monitoring of work in progress and completed

editing ensured consistency of classification character and adherence to project requirements across the entire project area.
- 2013-04-01 00:00:00 - The NOAA Office for Coastal Management (OCM) received topographic files in LAS format. The files contained lidar elevation and intensity measurements. The data were received in UTM Zone 19N (NAD83) coordinates and were vertically referenced to NAVD88 using the Geoid12a model. The vertical units of the data were meters. OCM performed the following processing for data storage and Digital Coast provisioning purposes: 1. The topographic las files were converted from orthometric (NAVD88) heights to ellipsoidal heights using Geoid03. 2. The topographic las files were converted from a Projected Coordinate System (UTM 19N) to a Geographic Coordinate system (GCS). 3. The topographic las files' horizontal units were converted from meters to decimal degrees.

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:
- 1.7. Data collection method(s)
- 3.1. Responsible Party for Data Management
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
https://www.fisheries.noaa.gov/inport/item/49794

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:
NOAA Office for Coastal Management (NOAA/OCM)

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:
https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=4950
https://coast.noaa.gov/htdata/lidar1_z/geoid18/data/4950

7.3. Data access methods or services offered:
This data can be obtained on-line at the following URL:

https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=4950

;

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Office for Coastal Management - Charleston, SC

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.